

General

Guideline Title

Treatment of the hypertensive disorders of pregnancy. In: Diagnosis, evaluation, and management of the hypertensive disorders of pregnancy: executive summary.

Bibliographic Source(s)

Magee LA, Pels A, Helewa M, Rey E, von Dadelszen P, Hypertension Guideline Committee. Treatment of the hypertensive disorders of pregnancy. In: Diagnosis, evaluation, and management of the hypertensive disorders of pregnancy: executive summary. J Obstet Gynaecol Can. 2014 May;36(5):426-34.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Magee LA, Helewa M, Moutquin JM, von Dadelszen P, Hypertension Guideline Committee, Society of Obstetricians and Gynaecologists of Canada. Treatment of the hypertensive disorders of pregnancy. In: Diagnosis, evaluation, and management of the hypertensive disorders of pregnancy. J Obstet Gynaecol Can. 2008 Mar;30(3 Suppl 1):S24-36.

Regulatory Alert

FDA Warning/Regulatory Alert

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- December 14, 2016 – General anesthetic and sedation drugs : The U.S. Food and Drug Administration (FDA) is warning that repeated or lengthy use of general anesthetic and sedation drugs during surgeries or procedures in children younger than 3 years or in pregnant women during their third trimester may affect the development of children's brains. Consistent with animal studies, recent human studies suggest that a single, relatively short exposure to general anesthetic and sedation drugs in infants or toddlers is unlikely to have negative effects on behavior or learning. However, further research is needed to fully characterize how early life anesthetic exposure affects children's brain development.

Recommendations

Major Recommendations

Definitions of the quality of evidence assessment (I-III) and classification of recommendations (A-E, L) are provided at the end of the "Major Recommendations" field.

Dietary and Lifestyle Changes

1. There is insufficient evidence to make a recommendation about the usefulness of the following: new severe dietary salt restriction for women with any hypertensive disorders of pregnancy (HDP), ongoing salt restriction among women with pre-existing hypertension, heart-healthy diet, and calorie restriction for obese women. (III-L)
2. There is insufficient evidence to make a recommendation about the usefulness of exercise, workload reduction, or stress reduction. (III-L)
3. For women with gestational hypertension (without preeclampsia), some bed rest in hospital (vs. unrestricted activity at home) may be useful to decrease severe hypertension and preterm birth. (I-B)
4. For women with preeclampsia who are hospitalized, strict bed rest is not recommended. (I-D)
5. For all other women with an HDP, the evidence is insufficient to make a recommendation about the usefulness of some bed rest, which may nevertheless be advised based on practical considerations. (III-C)

The following recommendations apply to women with either pre-existing or gestational hypertension.

Place of Care

6. In-patient care should be provided for women with severe hypertension or severe preeclampsia. (II-2B).
7. A component of care through hospital day units or home care can be considered for women with non-severe preeclampsia or non-severe pre-existing or gestational hypertension. (I-B, II-2B)

Antihypertensive Therapy for Severe Hypertension

8. Blood pressure should be lowered to <160 mmHg systolic and <110 mmHg diastolic. (I-A)
9. Initial antihypertensive therapy in the hospital setting should be with nifedipine short-acting capsules, parenteral hydralazine, or parenteral labetalol. (I-A) See Table 7 in the original guideline document.
10. Alternative antihypertensive medications include a nitroglycerin infusion (I-B), oral methyldopa (I-B), oral labetalol (I-B), oral clonidine (III-B), or postpartum, oral captopril. (III-B)
11. Refractory hypertension may be treated with sodium nitroprusside. (III-B)
12. Nifedipine and magnesium sulphate can be used contemporaneously. (II-2B)
13. Magnesium sulphate is not recommended solely as an antihypertensive agent. (I-E)
14. Continuous fetal heart rate monitoring is advised until blood pressure is stable. (III-L)

Antihypertensive Therapy for Non-severe Hypertension *Without* Comorbid Conditions

15. Antihypertensive drug therapy may be used to keep systolic blood pressure at 130 to 155 mmHg and diastolic blood pressure at 80 to 105 mmHg. (I-B)
16. The choice of antihypertensive agent for initial treatment should be based on characteristics of the patient, contraindications to a particular drug, and physician and patient preference. (III-C)
17. Initial therapy in pregnancy can be with one of a variety of antihypertensive agents available in Canada: methyldopa (I-A), labetalol (I-A), other beta-blockers (acebutolol, metoprolol, pindolol, and propranolol), (I-B) and calcium channel blockers (nifedipine). (I-A) See Table 8 in the original guideline document.
18. Angiotensin-converting enzyme inhibitors and angiotensin receptor blockers should not be used during pregnancy. (II-2E)
19. Atenolol and prazosin are not recommended prior to delivery. (I-D)

For Non-severe Hypertension (BP of 140–159/90–109 mmHg) *with* Comorbid Conditions

20. For women with co-morbid conditions, antihypertensive drug therapy should be used to keep systolic blood pressure at <140 mmHg and diastolic blood pressure at <90 mmHg. (III-C)
21. Initial therapy in pregnancy can be with one of a variety of antihypertensive agents as listed for women without co-morbidities. (III-C)
22. Captopril, enalapril, or quinapril may be used postpartum, even during breastfeeding. (III-B)

Corticosteroids for Acceleration of Fetal Pulmonary Maturity

23. Antenatal corticosteroid therapy should be considered for all women who present with preeclampsia at $\leq 34+6$ weeks' gestation. (I-A)
24. Antenatal corticosteroid therapy should be considered for women who present at $\leq 34+6$ weeks' gestation with gestational hypertension (despite the absence of proteinuria or adverse conditions) only if delivery is contemplated within the next 7 days. (III-L)

25. A rescue dose of corticosteroids may be considered for women at $\leq 34+6$ weeks' gestation who remain at high risk of preterm delivery 7 days or more after an initial course of antenatal corticosteroids. (I-C)
26. Antenatal corticosteroids may be considered for women delivered by elective Caesarean delivery at $\leq 38+6$ weeks' gestation to reduce respiratory morbidity. (I-B)

Timing of Delivery for Women with Preeclampsia

Delivery is the only intervention that initiates resolution of preeclampsia, and women with gestational hypertension or pre-existing hypertension may develop preeclampsia.

27. Consultation with an obstetrician (by telephone if necessary) is mandatory in women with severe preeclampsia. (III-B)
28. All women with severe preeclampsia should be delivered immediately (either vaginally or by Caesarean), regardless of gestational age. (III-C)
29. For women with non-severe preeclampsia at $< 24+0$ weeks' gestation, counselling should include, as an option, information about delivery within days. (II-2B)
30. For women with non-severe preeclampsia at $24+0$ to $33+6$ weeks' gestation, expectant management should be considered, but only in perinatal centres capable of caring for very preterm infants. (I-B)
31. For women with non-severe preeclampsia at $34+0$ to $36+6$ weeks' gestation, there is insufficient evidence to make a recommendation about the benefits or risks of expectant management. (III-L)
32. For women with preeclampsia at $\geq 37+0$ weeks' gestation, immediate delivery is recommended. (I-A)
33. For women with non-severe preeclampsia complicated by hemolysis, elevated liver enzymes, low platelets syndrome at $24+0$ to $34+6$ weeks' gestation, consider delaying delivery long enough to administer antenatal corticosteroids for acceleration of fetal pulmonary maturity if there is temporary improvement in maternal laboratory testing. (II-2B)
34. All women with hemolysis, elevated liver enzymes, low platelets syndrome at $\geq 35+0$ weeks' gestation should be considered for immediate delivery. (II-2B)

Timing of Delivery for Women with Gestational Hypertension

35. For women with gestational hypertension (without preeclampsia) at $\geq 37+0$ weeks' gestation, delivery within days should be discussed. (I-B)
36. For women with gestational hypertension (without preeclampsia) at $< 37+0$ weeks' gestation, there is insufficient evidence to make a recommendation about the benefits or risks of expectant management. (III-L)

Timing of Delivery for Women with Pre-existing Hypertension

37. For women with uncomplicated pre-existing hypertension who are otherwise well at $\geq 37+0$ weeks' gestation, delivery should be considered at $38+0$ to $39+6$ weeks' gestation. (II-1B)

Mode of Delivery

38. For women with any hypertensive disorder of pregnancy, vaginal delivery should be considered unless a Caesarean delivery is required for the usual obstetric indications. (II-2B)
39. If vaginal delivery is planned and the cervix is unfavourable, then cervical ripening should be used to increase the chance of a successful vaginal delivery. (I-A)
40. At a gestational age remote from term, women with a hypertensive disorder of pregnancy with evidence of fetal compromise may benefit from delivery by emergency Caesarean section. (II-2B)
41. Antihypertensive treatment should be continued throughout labour and delivery to maintain systolic blood pressure at < 160 mmHg and diastolic blood pressure at < 110 mmHg. (II-2B)
42. The third stage of labour should be actively managed with oxytocin, 5 units intravenous or 10 units intramuscular, particularly in the presence of thrombocytopenia or coagulopathy. (I-A)
43. Ergometrine maleate should not be administered to women with any hypertensive disorder of pregnancy, particularly preeclampsia or gestational hypertension; alternative oxytocics should be considered. (II-3D)

Anaesthesia: General Principles

44. The anaesthesiologist should be informed when a woman with preeclampsia is admitted to the delivery suite. (II-3B)
45. Early insertion of an epidural catheter (in the absence of contraindications) is recommended for control of labour pain. (I-A)
46. In the absence of contraindications, all of the following are acceptable methods of anaesthesia for women undergoing Caesarean delivery: epidural, spinal, combined spinal-epidural, and general anaesthesia. (I-A)

47. A routine fixed intravenous fluid bolus should not be administered prior to neuraxial anaesthesia. (I-E)

Anaesthesia: Fluid Administration

48. Intravenous and oral fluid intake should be minimized in women with preeclampsia, to avoid pulmonary edema. (II-2B)
49. Fluid should not be routinely administered to treat oliguria (<15 mL/hr for 6 consecutive hours). (III-D)
50. For treatment of persistent oliguria, neither dopamine nor furosemide is recommended. (I-E)
51. Phenylephrine or ephedrine may be used to prevent or treat hypotension during neuraxial anaesthesia. (I-A)

Monitoring

52. Arterial line insertion may be used for continuous arterial blood pressure monitoring when blood pressure control is difficult or there is severe bleeding. (II-3B)
53. Central venous pressure monitoring is not routinely recommended, and if a central venous catheter is inserted, it should be used to monitor trends and not absolute values. (II-2D)
54. Pulmonary artery catheterization is not recommended unless there is a specific associated indication (III-D), and then only in an intensive care unit setting. (III-B)

Coagulation

55. Upon admission to delivery suite, women with preeclampsia should have a platelet count done. (II-1A)
56. Neuraxial analgesia and/or anaesthesia are appropriate in women:
a. With preeclampsia, provided there are no associated coagulation concerns (II-2E) (see Table 9 in the original guideline document)
b. With a platelet count $\geq 75 \times 10^9/L$ (II-2B)
c. Taking low-dose acetylsalicylic acid in the presence of an adequate platelet count (I-A)
d. Receiving unfractionated heparin in a dose of $\leq 10,000$ IU/d subcutaneously, 4 hours after the last dose and possibly immediately after the last dose without any delay (III-B)
e. Receiving unfractionated heparin in a dose $>10,000$ IU/d subcutaneously if they have a normal activated partial thromboplastin time 4 hours after the last dose (III-B)
f. Receiving intravenous heparin in a therapeutic dose if they have a normal activated partial thromboplastin time 4 hours after the last dose (III-B)
g. Receiving low-molecular-weight heparin 10 to 12 hours after a prophylactic dose, or 24 hours after a therapeutic dose (III-B)

Aspects of Care Specific to Women with Pre-Existing Hypertension

57. Pre-conceptual counselling for women with pre-existing hypertension is recommended. (III-C)
58. The following antihypertensive drugs are all acceptable for use in the first trimester of pregnancy: methyldopa, labetalol, and nifedipine. (II-2B)
59. Angiotensin-converting enzyme inhibitors and angiotensin receptor blockers should be discontinued when planning pregnancy or as soon as pregnancy is diagnosed. (II-2D)
60. Atenolol should be discontinued when pregnancy is diagnosed. (I-D)
61. Planned changes in antihypertensive agent(s) for care in pregnancy should be made while the woman is planning pregnancy if the woman has uncomplicated pre-existing hypertension, or, if in the presence of co-morbid conditions, she is likely to conceive easily (within 12 months). (III-L)

Aspects of Care for Women with Preeclampsia: Magnesium Sulphate for Preventing or Treating Eclampsia

62. Magnesium sulphate is recommended for first-line treatment of eclampsia. (I-A)
63. Magnesium sulphate is recommended as prophylaxis against eclampsia in women with severe preeclampsia. (I-A)
64. Magnesium sulphate may be considered as prophylaxis against eclampsia in women with non-severe preeclampsia but with severe hypertension, headaches/visual symptoms, right upper quadrant/epigastric pain, platelet count $<100,000 \times 10^9/L$, progressive renal insufficiency, and/or elevated liver enzymes, based on cost considerations. (I-C)
65. Magnesium sulphate should be used in standard dosing, usually 4 g intravenous loading dose followed by 1 g/hour. (I-A)
66. Routine monitoring of serum magnesium levels is not recommended. (I-E)
67. Phenytoin and benzodiazepines should not be used for eclampsia prophylaxis or treatment, unless there is a contraindication to magnesium sulphate or it is ineffective. (I-E)
68. In women with pre-existing or gestational hypertension, magnesium sulphate should be considered for fetal neuroprotection in the setting of

imminent preterm birth (within the next 24 hours) at $\leq 31+6$ weeks. (I-A)

69. Delivery should not be delayed in order to administer antenatal magnesium sulphate for fetal neuroprotection if there are maternal and/or fetal indications of emergency delivery. (III-E)

Aspects of Care for Women with Preeclampsia: Plasma Volume Expansion

70. Plasma volume expansion is not recommended for women with preeclampsia. (I-E)

Therapies for Hemolysis, Elevated Liver Enzymes, Low Platelets (HELLP) Syndrome

71. Every obstetrical centre should be aware of the local delay between ordering and receiving platelets units. (III-B)
72. For a platelet count of $<20 \times 10^9/L$ with hemolysis, elevated liver enzymes, low platelets syndrome, platelet transfusion is recommended regardless of mode of delivery. (III-B) See Table 9 in the original guideline document.
73. For a platelet count of 20×10^9 to $49 \times 10^9/L$ with hemolysis, elevated liver enzymes, low platelets syndrome, platelet transfusion is recommended prior to Caesarean delivery. (III-B) See Table 9 in the original guideline document.
74. For a platelet count of 20×10^9 to $49 \times 10^9/L$ with hemolysis, elevated liver enzymes, low platelets syndrome, platelet transfusion should be considered prior to vaginal delivery if there is excessive active bleeding, known platelet dysfunction, a rapidly falling platelet count, or coagulopathy. (II-2D) See Table 10 in the original guideline document.
75. For a platelet count of $\geq 50 \times 10^9/L$ with hemolysis, elevated liver enzymes, low platelets syndrome, platelet transfusion and/or packed red blood cells should be considered prior to either Caesarean or vaginal delivery only if there is excessive active bleeding, known platelet dysfunction, a rapidly falling platelet count, or coagulopathy. (III-B)
76. The guideline developers do not recommend corticosteroids for treatment of hemolysis, elevated liver enzymes, low platelets syndrome until they have been proven to decrease maternal morbidity. (II-3L)
77. The guideline developers recommend against plasma exchange or plasmapheresis for hemolysis, elevated liver enzymes, low platelets syndrome, particularly within the first 4 days postpartum. (II-3E)

Care in the 6 Weeks Postpartum

78. Blood pressure should be measured during the time of peak postpartum blood pressure, at days 3 to 6 after delivery. (III-B)
79. Women with postpartum hypertension should be evaluated for preeclampsia (either arising de novo or worsening from the antenatal period). (II-2B)
80. Consideration should be given to continuing antihypertensive therapy postpartum, particularly in women with antenatal preeclampsia and those who delivered preterm. (II-2L)
81. Severe postpartum hypertension must be treated with antihypertensive therapy to keep systolic blood pressure <160 mmHg and diastolic blood pressure <110 mmHg. (I-A)
82. In women without co-morbidities, antihypertensive therapy should be considered to treat non-severe postpartum hypertension to keep blood pressure $<140/90$ mmHg. (III-L)
83. Women with co-morbidities other than pre-gestational diabetes mellitus should be treated to keep blood pressure $<140/90$ mmHg. (III-C)
84. Women with pre-gestational diabetes mellitus should be treated to keep blood pressure $<130/80$ mmHg. (III-C)
85. Antihypertensive agents generally acceptable for use in breastfeeding include the following: nifedipine XL, labetalol, methyldopa, captopril, and enalapril. (III-B)
86. There should be confirmation that end-organ dysfunction of preeclampsia has resolved. (III-C)
87. Non-steroidal anti-inflammatory drugs should not be given postpartum if hypertension is difficult to control, there is evidence of kidney injury (oliguria and/or creatinine $\geq 90 \mu M$), or platelets are <50 to $10^9/L$. (III-C)
88. Postpartum thromboprophylaxis should be considered in women with preeclampsia, particularly in the presence of other risk factors. (II-2B)

Care Beyond 6 Weeks Postpartum

89. Women with a history of severe preeclampsia (particularly those who presented or delivered before 34 weeks' gestation) should be screened for pre-existing hypertension and underlying renal disease. (II-2B)
90. Referral for internal medicine or nephrology consultation (by telephone if necessary) should be considered for women with:
- Postpartum hypertension that is difficult to control
 - Women who had preeclampsia and have at 3 to 6 months postpartum, either ongoing proteinuria, decreased estimated glomerular filtration rate (eGFR) (<60 mL/min), or another indication of renal disease, such as abnormal urinary sediment. (III-A)
91. Women who are overweight should be encouraged to attain a healthy body mass index to decrease risk in future pregnancy (II-2A) and for

long-term health. (I-A)

92. Women with pre-existing hypertension or persistent postpartum hypertension should undergo the following investigations (if not done previously) at least 6 weeks postpartum: urinalysis; serum sodium, potassium and creatinine; fasting glucose; fasting lipid profile; and standard 12-lead electrocardiography. (III-L)
93. Women who are normotensive but who have had a hypertensive disorder of pregnancy, may benefit from assessment of traditional cardiovascular risk markers. (II-2B)
94. All women who have had a hypertensive disorder of pregnancy should pursue a healthy diet and lifestyle. (I-B)

Effects of Maternal Hypertension and Its Therapies on Child Neurobehavioural Development

95. Clinicians should be aware that gestational hypertension and preeclampsia may each be associated with an increase in adverse paediatric neuro-developmental effects, such as inattention and externalizing behaviours (e.g., aggressiveness). (II-2B).
96. Clinicians should be reassured that there is no compelling evidence that antihypertensive medications (specifically labetalol, nifedipine, or methyldopa) are themselves associated with clear adverse neurodevelopmental effects. (I-B)

Definitions:

Quality of Evidence Assessment*

I: Evidence obtained from at least one properly randomized controlled trial

II-1: Evidence from well-designed controlled trials without randomization

II-2: Evidence from well-designed cohort (prospective or retrospective) or case-control studies, preferably from more than one centre or research group

II-3: Evidence obtained from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of treatment with penicillin in the 1940s) could also be included in this category

III: Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees

*Adapted from The Evaluation of Evidence criteria described in the Canadian Task Force on Preventive Health Care.

Classification of Recommendations†

A. There is good evidence to recommend the clinical preventive action

B. There is fair evidence to recommend the clinical preventive action

C. The existing evidence is conflicting and does not allow to make a recommendation for or against use of the clinical preventive action; however, other factors may influence decision-making

D. There is fair evidence to recommend against the clinical preventive action

E. There is good evidence to recommend against the clinical preventive action

L. There is insufficient evidence (in quantity or quality) to make a recommendation; however, other factors may influence decision-making

†Adapted from the Classification of Recommendations criteria described in the Canadian Task Force on Preventive Health Care.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Hypertensive disorders of pregnancy (HDP):

- Pre-existing hypertension
- Gestational hypertension
- Preeclampsia
- Other hypertensive effects

Guideline Category

Counseling

Management

Treatment

Clinical Specialty

Anesthesiology

Cardiology

Family Practice

Internal Medicine

Obstetrics and Gynecology

Surgery

Intended Users

Advanced Practice Nurses

Dietitians

Hospitals

Nurses

Physician Assistants

Physicians

Guideline Objective(s)

- To present in brief the current evidence assessed in the clinical practice guideline prepared by the Canadian Hypertensive Disorders of Pregnancy Working Group and published by *Pregnancy Hypertension* to provide a reasonable approach to the diagnosis, evaluation, and treatment of the hypertensive disorders of pregnancy (HDP)
- To support evidence-based maternity care of women who are planning pregnancy and are at risk of a HDP, have an HDP in the current pregnancy, or are postpartum and had an HDP

Target Population

Women who are planning pregnancy and are at risk of a hypertensive disorder of pregnancy (HDP), have an HDP in the current pregnancy, or are postpartum and had an HDP

Interventions and Practices Considered

Antenatal/Perinatal Management

1. Bed rest in hospital (women with gestational hypertension without preeclampsia)
2. In-patient care for women with severe hypertension or severe preeclampsia
3. Antihypertensive therapy for severe hypertension
 - Pharmacological agents: nitroglycerin infusion, oral methyldopa, oral labetalol, oral clonidine, sodium nitroprusside, nifedipine, parenteral hydralazine, parenteral labetalol and magnesium sulphate
 - Continuous fetal heart rate monitoring
4. Antihypertensive therapy for non-severe hypertension
 - Consideration of characteristics of the patient, contraindications to a particular drug, and physician and patient preference
 - Pharmacological agents: methyldopa, labetalol, other beta-blockers (acebutolol, metoprolol, pindolol, and propranolol), and calcium channel blockers (nifedipine)
5. Corticosteroids for acceleration of fetal pulmonary maturity
6. Timing of delivery
 - Consultation with an obstetrician
 - Immediate delivery
 - Delivery within days
 - Expectant management (women with non-severe preeclampsia if indicated)
 - Consideration of hemolysis, elevated liver enzymes, and low platelets (HELLP) syndrome
7. Consideration of mode of delivery
 - Vaginal delivery vs. Caesarean delivery
 - Cervical ripening (in vaginal delivery)
 - Continuation of antihypertensive treatment throughout delivery
 - Oxytocin (in third stage of delivery)
8. Anaesthesia during delivery
 - Notification of preeclampsia delivery to anesthesiologist
 - Epidural catheter
 - Epidural, spinal, combined spinal-epidural, and general anaesthesia
 - Minimization of fluid intake
 - Phenylephrine or ephedrine
9. Monitoring (arterial line)
10. Pre-conceptual counselling for women with pre-existing hypertension
11. Magnesium sulphate
12. Platelet transfusion for HELLP syndrome

Note: The following interventions were considered but not recommended or there was insufficient evidence to make a recommendation: dietary salt restriction, heart-healthy diet or calorie restriction, exercise, workload and stress reduction, strict bed rest for women with preeclampsia and bed rest for all other women with hypertensive disorders of pregnancy (HDP), angiotensin-converting enzyme inhibitors and angiotensin receptor blockers, atenolol and prazosin, ergometrine maleate, routine fixed intravenous fluid bolus prior to neuraxial anaesthesia, dopamine or furosemide for persistent oliguria, monitoring with central venous pressure or pulmonary artery catheterization, routine monitoring of serum magnesium levels, phenytoin and benzodiazepines, plasma volume expansion, corticosteroids, plasma exchange or plasmapheresis for HELLP syndrome.

Postpartum Treatment

Care in the Six Weeks Postpartum

1. Blood pressure monitoring
2. Evaluation for preeclampsia
3. Antihypertensive therapy (nifedipine XL, labetalol, methyldopa, captopril, and enalapril)
4. Avoidance of non-steroidal anti-inflammatory drugs
5. Thromboprophylaxis

Care Beyond Six Weeks Postpartum

1. Screening for pre-existing hypertension, underlying renal disease
2. Referral for internal medicine or nephrology consultation
3. Weight management
4. Laboratory tests (urinalysis; serum sodium, potassium and creatinine; fasting glucose; fasting lipid profile; and standard 12-lead electrocardiography)

5. Assessment of traditional cardiovascular risk markers
6. Healthy diet and lifestyle
7. Consideration of effects of maternal hypertension on child neurobehavioral development

Major Outcomes Considered

- Maternal and fetal effects of pre-existing, gestational, and postpartum hypertension
- Preeclampsia
- Non-severe hypertension with and without comorbid conditions
- Severe hypertension with and without comorbid conditions
- Fetal pulmonary maturity (e.g., fetal respiratory morbidity)
- Caesarean section
- Preterm delivery
- Timing of delivery
- Excessive active bleeding, known platelet dysfunction, a rapidly falling platelet count, or coagulopathy during delivery
- Coagulation
- Hemolysis, elevated liver enzymes, and low platelets (HELLP) syndrome
- Renal insufficiency
- Breastfeeding safety
- Perinatal, prenatal, and postpartum comorbidities (e.g., diabetes mellitus)
- Impact of antihypertensive medications and adverse neurodevelopmental effects on child

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Searches of Unpublished Data

Description of Methods Used to Collect/Select the Evidence

Published literature was retrieved through searches of MEDLINE, Cumulative Index of Nursing and Allied Health Literature (CINAHL), and The Cochrane Library in March 2012 using appropriate controlled vocabulary (e.g., pregnancy, hypertension, pre-eclampsia, pregnancy toxemias) and key words (e.g., diagnosis, evaluation, classification, prediction, prevention, prognosis, treatment, postpartum follow-up). Results were restricted to systematic reviews, randomized control trials, controlled clinical trials, and observational studies published in French or English between January 2006 and February 2012. Searches were updated on a regular basis and incorporated in the guideline to September 2013. Grey (unpublished) literature was identified through searching the websites of health technology assessment and health technology-related agencies, clinical practice guideline collections, clinical trial registries, and national and international medical specialty societies.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Quality of Evidence Assessment*

I: Evidence obtained from at least one properly randomized controlled trial

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II-2: Evidence from well-designed cohort (prospective or retrospective) or case-control studies, preferably from more than one centre or research group

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III: Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees

*Adapted from The Evaluation of Evidence criteria described in the Canadian Task Force on Preventive Health Care.

Methods Used to Analyze the Evidence

Systematic Review

Description of the Methods Used to Analyze the Evidence

The quality of evidence in the guideline summarized here was rated using the criteria described in the Report of the Canadian Task Force on Preventative Health Care (see the "Rating Scheme for the Strength of the Evidence" field).

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Not stated

Rating Scheme for the Strength of the Recommendations

Classification of Recommendations*

A. There is good evidence to recommend the clinical preventive action

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C. The existing evidence is conflicting and does not allow to make a recommendation for or against use of the clinical preventive action; however, other factors may influence decision-making

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*Adapted from the Classification of Recommendations criteria described in the Canadian Task Force on Preventive Health Care.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

The guideline has been prepared by the Canadian Hypertensive Disorders of Pregnancy Working Group, reviewed and approved by the Hypertension Guideline Committee, reviewed by the Maternal Fetal Medicine and Family Physician Advisory committees, and approved by the Executive and Council of the Society of Obstetricians and Gynaecologists of Canada.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

The expected benefit of this guideline is improved outcomes for mother, baby, and child through evidence-advised practice.

Potential Harms

- Labetalol is best avoided in women with asthma or heart failure. Neonatology should be informed if the woman is in labour, as parenteral labetalol may cause neonatal bradycardia.
- Staff should be aware of the distinction between short-acting nifedipine capsules used to treat severe hypertension and both the intermediate-acting prolonged action tablet (which can be used for treatment of nonsevere or severe hypertension), and the slow-release tablets (extended release) that are used for non-severe hypertension.
- Hydralazine may increase the risk of maternal hypotension.

Contraindications

Contraindications

- Abnormal international normalized ratio (INR) or activated partial thromboplastin time (aPTT) (regardless of platelet count) is a contraindication of neuraxial anaesthesia.
- Angiotensin-converting enzyme inhibitors and angiotensin receptor blockers should not be used during pregnancy.

Qualifying Statements

Qualifying Statements

This guideline reflects emerging clinical and scientific advances as of the date issued and are subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed. Local institutions can dictate amendments to these opinions. They should be well documented if modified at the local level. None of these contents may be reproduced in any form without prior written

permission of the Society of Obstetricians and Gynaecologists of Canada (SOGC).

Implementation of the Guideline

Description of Implementation Strategy

The Appendix (see Table 10 in the full version of the original guideline document [see the "Availability of Companion Documents" field]) lists tools to support the application of this guideline. Some Web sites provide general information about blood pressure (BP) measurement for non-pregnant patients, but the recommendations are similar enough to those for pregnant women to be useful. Patients, their partners, and their care providers should be well educated about the hypertensive disorders of pregnancy (HDP), and relevant sites are listed.

Implementation of any evidence depends on individual knowledge and beliefs, as well as institutional culture. Strong recommendations should be incorporated into clinical practice. In well-resourced settings, almost all preeclampsia-related maternal deaths involve substandard care.

Some updates to the 2008 Society of Obstetricians and Gynaecologists of Canada (SOGC) guidelines on the HDP may require additional effort to implement.

Physicians should consider the category "other HDP" (white-coat and masked hypertension) as part of the classification of hypertensive women and consider using some form of out-of-office BP measurement to evaluate women with non-severe pre-existing or gestational hypertension.

Health care providers should inform pregnant women about the symptoms and signs of the HDPs and refer them to appropriate knowledge translation tools.

The developer recommends the use of corticosteroids for women $\leq 34+6$ weeks' gestation who are at high risk of delivery within the next seven days. This gestational age cut-off represents a fundamental change in practice that will require discussion.

Physicians should be familiar with the blood bank policies of their own hospital.

Physicians should be aware of postpartum signs of maternal posttraumatic stress disorder and the maternal and perinatal long-term effects of HDPs, especially at this vulnerable time in maternal care when the maternity care provider is often handing back care to the primary care physician.

The reader is reminded to refer to the full open-access guideline published in Pregnancy Hypertension, which contains not only the recommendations presented here, but also all explanatory text and additional references.

Implementation Tools

Foreign Language Translations

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Staying Healthy

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

Magee LA, Pels A, Helewa M, Rey E, von Dadelszen P, Hypertension Guideline Committee. Treatment of the hypertensive disorders of pregnancy. In: Diagnosis, evaluation, and management of the hypertensive disorders of pregnancy: executive summary. J Obstet Gynaecol Can. 2014 May;36(5):426-34.

Adaptation

Not applicable: The guideline was not adapted from another source.

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Guideline Developer(s)

Society of Obstetricians and Gynaecologists of Canada - Medical Specialty Society

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Guideline Committee

Canadian Hypertensive Disorders of Pregnancy Working Group

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Financial Disclosures/Conflicts of Interest

Disclosure statements have been received from all members of the committee.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Magee LA, Helewa M, Moutquin JM, von Dadelszen P, Hypertension Guideline Committee, Society of Obstetricians and Gynaecologists of Canada. Treatment of the hypertensive disorders of pregnancy. In: Diagnosis, evaluation, and management of the hypertensive disorders of pregnancy. J Obstet Gynaecol Can. 2008 Mar;30(3 Suppl 1):S24-36.

Guideline Availability

Electronic copies: Available in Portable Document Format (PDF) from the [Society of Obstetricians and Gynaecologists of Canada \(SOGC\) Web site](#) . Also available in French from the [SOGC Web site](#) .

Print copies: Available from the Society of Obstetricians and Gynaecologists of Canada, La société des obstétriciens et gynécologues du Canada (SOGC) 780 promenade Echo Drive Ottawa, ON K1S 5R7 (Canada); Phone: 1-800-561-2416.

Availability of Companion Documents

The following is available:

- Magee LA, Pels A, Helewa M, Rey E, Von Dadelszen P, Canadian Hypertensive Disorders of Pregnancy (HDP) Working Group. Diagnosis, evaluation, and management of the hypertensive disorders of pregnancy. Pregnancy Hypertens. 2014 Apr;(4)2:104-45. Electronic copies: Available from the [Pregnancy Hypertension: An International Journal of Women's Cardiovascular Health Web site](#) .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on February 17, 2009. The information was verified by the guideline developer on March 13, 2009. This summary was updated by ECRI Institute on July 12, 2013 following the U.S. Food and Drug Administration advisory on Magnesium Sulfate. This summary was updated by ECRI Institute on June 5, 2014. The information was verified by the guideline developer on June 23, 2014. This summary was updated by ECRI Institute on February 15, 2017 following the U.S. Food and Drug Administration advisory on general anesthetic and sedation drugs.

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